Listing of the Claims:

This listing of claims will replace all prior versions, and listings, of claims in this application.

1. (currently amended) A communication bus suitable for use in a hazardous area of a process plant to transmit electrical signals from one process device to a second and different process device disposed within the process plant, the communication bus comprising:

a first end to connect to the one process device;

a second end to connect to the second and different process device;

a first transmission path that communicates electrical signals in a first direction between the first end and the second end;

a second transmission path that communicates electrical signals in a second direction between the first end and the second end; and

a safety device coupled to each of the first and second transmission paths between the first and second ends, wherein the safety device includes a control unit to detect a fault condition associated with the communication bus, and wherein the safety device further includes a switch unit connected to the first and second transmission paths and having a closed position allowing a flow of electrical signals along the first and second transmission paths and an open position preventing the flow of electrical signals along the first and second transmission paths, and wherein the control unit causes the switch unit to move to the open position to interrupt the flow of electrical signals between the first and second ends along each of the first and second transmission paths in response to ~~the detected~~ detecting a fault condition in the communication bus at the control unit.

2. (original) The communication bus of claim 1, wherein the detected fault condition associated with the communication bus includes at least one of an open circuit, an electrical discontinuity, a cut in the communication bus, a severed communication bus, and a disconnected end of the communication bus.

3. (original) The communication bus of claim 1, further including a third transmission path and a fourth transmission path, wherein the safety device is coupled to each of the third and fourth transmission paths.

4. (original) The communication bus of claim 3, wherein each of the first, second, third, and fourth transmission paths includes twisted pair cable or coaxial cable.

5. (previously presented) The communication bus of claim 3, wherein the control unit includes a first control device coupled to the third transmission path and a second control device coupled to the fourth transmission path, wherein the first control device includes a first signal source that generates an electrical signal that is communicated in the first direction along the third transmission path, and wherein the second control device includes a second signal source that generates an electrical signal that is communicated in the second direction along the fourth transmission path.

6. (previously presented) The communication bus of claim 5, wherein the first control device includes a first sensor that measures an electrical characteristic associated with the third transmission path, and wherein the second control device includes a second sensor that measures an electrical characteristic associated with the fourth transmission path.

7. (original) The communication bus of claim 6, wherein the measured electrical characteristic associated with each of the third and fourth transmission paths includes current, voltage, or resistance.

8. (previously presented) The communication bus of claim 6, wherein the first control device includes a first comparator that compares the measured electrical

characteristic associated with the third transmission path to a normal operational value, and wherein the second control device includes a second comparator that compares the measured electrical characteristic associated with the fourth transmission path to the normal operational value.

9. (original) The communication bus of claim 8, wherein the switch unit includes a first switch coupled to the first control device and a second switch coupled to the second control device.

10. (original) The communication bus of claim 9, wherein at least one of the first switch, the second switch, the first control device, and the second control device is housed in a protective enclosure.

11. (original) The communication bus of claim 9, wherein the first switch includes a first relay and a second relay, and the second switch includes a third relay and a fourth relay, wherein each of the first and second relays is coupled to the first control device, and wherein each of the third and fourth relays is coupled to the second control device.

12. (previously presented) The communication bus of claim 11, wherein the first control device energizes and de-energizes coils associated with each of the first and second relays, and wherein the second control device energizes and de-energizes coils associated with each of the third and fourth relays.

13. (original) The communication bus of claim 11, wherein each of the first and third relays is coupled to the first transmission path, and wherein each of the second and fourth relays is coupled to the second transmission path.

14. (original) The communication bus of claim 13, wherein each of the first, second, third, and fourth relays includes contacts that are closed during normal operation.

15. (previously presented) The communication bus of claim 14, wherein the first control device opens the contacts of the first and second relays in response to a change in the measured electrical characteristic associated with the third transmission path from the normal operational value, and wherein the second control device opens the contacts of the third and fourth relays in response to a change in the measured electrical characteristic associated with the fourth transmission path from the normal operational value.

16. (currently amended) A safety device adapted for use in a hazardous area of a process plant, the safety device comprising:

a communication bus including a first end to connect to one process device and a second end to connect to a second process device and including a first transmission line disposed between and communicatively connecting the first end and the second end and a second transmission line, wherein both the first and second transmission lines are disposed between the one process device and the second process device disposed at different locations within the process plant and at least the first transmission line is coupled to communicate electrical signals between the one process device and the second process device;

a control unit coupled to the second transmission line to detect a fault condition associated with the communication bus; and

a switch unit coupled to the first transmission line between the first end and the second end and to the control unit and having a closed position allowing a flow of electrical signals along the first transmission line and an open position preventing the flow of electrical signals along the first transmission line, wherein the control unit causes the switch unit ~~operates~~ to move to the open position to interrupt the flow of electrical signals along the first transmission line between the first end and the second end in response to ~~the detected~~ detecting a fault condition associated with the communication bus at the control unit.

17. (previously presented) The safety device of claim 16, wherein the control unit includes a sensor to measure an electrical characteristic associated with the second transmission line.

18. (original) The safety device of claim 17, wherein the measured electrical characteristic associated with the second transmission line includes current, voltage, or resistance.

19. (previously presented) The safety device of claim 17, wherein the control unit includes a comparator to compare the measured electrical characteristic associated with the second transmission line to a normal operational value.

20. (previously presented) The safety device of claim 19, wherein the first transmission line includes a first transmission signal path to communicate electrical signals in a first direction, and a second transmission signal path to communicate electrical signals in a second direction.

21. (previously presented) The safety device of claim 20, wherein the second transmission line includes a third transmission signal path to communicate electrical signals in the first direction, and a fourth transmission signal path to communicate electrical signals in the second direction.

22. (original) The safety device of claim 21, wherein each of the first, second, third, and fourth transmission signal paths includes one wire or two wires.

23. (original) The safety device of claim 21, wherein the control unit includes a first control device coupled to the third transmission signal path and a second control device coupled to the fourth transmission signal path.

24. (original) The safety device of claim 23, wherein the switch unit includes a first switch, a second switch, a third switch, and a fourth switch, wherein each of the first and third switches is coupled to the first transmission signal path, and wherein each of the second and fourth switches is coupled to the second transmission signal path.

25. (original) The safety device of claim 24, wherein the first control device is coupled to each of the first and second switches, and wherein the second control device is coupled to each of the third and fourth switches.

26. (original) The safety device of claim 25, wherein each of the first, second, third, and fourth switches includes contacts that are closed during normal operation.

27. (previously presented) The safety device of claim 26, wherein the first control device operates to open the contacts of the first and second switches in response to a change in the measured electrical characteristic associated with the third transmission signal path from the normal operational value, and wherein the second control device operates to open the contacts of the third and fourth switches in response to a change in the measured electrical characteristic associated with the fourth transmission signal path from the normal operational value.

28. (original) The safety device of claim 16, wherein each of the first and second transmission lines includes a twisted pair cable or a coaxial cable.

29. (previously presented) The safety device of claim 16, wherein the first transmission line communicates electrical signals using a communication protocol based on Ethernet, Fieldbus, HART, PROFIBUS, WORLDFIP, Device-Net, As-Interface, or CAN.

30. (previously presented) The safety device of claim 16, wherein the control unit includes a signal source that operates to generate an electrical signal that is communicated along the second transmission line.

31. (currently amended) A method for providing a communication bus suitable for use in a hazardous area of a process plant, the method comprising:

communicating electrical signals from a first process device to a second process device by communicating the electrical signals from a first end of the communication bus to a second end of the communication bus along a first transmission path disposed between and communicatively connecting the first end and the second end of the communication bus;

communicating electrical signals along a second transmission path within the communication bus;

measuring an electrical characteristic associated with the second transmission path;

detecting a fault condition associated with the communication bus in response to the measured electrical characteristic associated with the second transmission path; and

interrupting the flow of electrical signals along the first transmission path at a point between the first end and the second end of the communication bus in response to ~~the detected~~ detecting a fault condition associated with the communication bus on the second transmission path.

32. (original) The method of claim 31, wherein detecting the fault condition associated with the communication bus includes detecting at least one of an open circuit, an

electrical discontinuity, a cut in the communication bus, a severed communication bus, and a disconnected end of the communication bus.

33. (original) The method of claim 31, wherein communicating electrical signals along the first transmission path includes communicating electrical signals in a first direction along a first pair of transmission wires and communicating electrical signals in a second direction along a second pair of transmission wires, and wherein communicating electrical signals along the second transmission path includes communicating electrical signals in the first direction along a third pair of transmission wires and communicating electrical signals in the second direction along a fourth pair of transmission wires.

34. (original) The method of claim 31, wherein communicating electrical signals along the first transmission path includes communicating electrical signals in a first direction along a first transmission wire and communicating electrical signals in a second direction along a second transmission wire, and wherein communicating electrical signals along the second transmission path includes communicating electrical signals in the first direction along a third transmission wire and communicating electrical signals in the second direction along a fourth transmission wire.

35. (original) The method of claim 31, wherein measuring the electrical characteristic associated with the second transmission path includes measuring current, voltage, or resistance.

36. (original) The method of claim 31, further including comparing the measured electrical characteristic associated with the second transmission path to a normal operational value.

37. (original) The method of claim 36, wherein interrupting the flow of electrical signals along the first transmission path includes opening switch contacts coupled to the first transmission path in response to a change in the measured electrical characteristic associated with the second transmission path from the normal operational value.

38. (previously presented) The communication bus of claim 1, further including a third transmission path and a fourth transmission path connected in a loop within the communication bus, wherein the safety device is coupled to each of the third and fourth transmission paths and wherein the control unit includes a signal source to send a generated signal through the third transmission path and receives a received signal on the fourth transmission path and detects a fault condition based on the received signal.

39. (previously presented) The communication bus of claim 10, wherein the safety device includes an intrinsically safe housing and the control unit and the switch unit are disposed in the intrinsically safe housing.

40. (previously presented) The communication bus of claim 10, wherein the safety device includes an explosion proof housing and the control unit and the switch unit are disposed in the explosion proof housing.